

The Effects of COVID-19 on Orthodontic Practice - a questionnaire based study

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Citation of this Article: Palash Bhawsar, Amitabh Kallury, Rajesh Kumar Balani, Chandni Bharti, Chandrika Dubey, Deepika Dhali, “The Effects of COVID-19 on Orthodontic Practice - a questionnaire based study”, IJDSIR- August - 2020, Vol. – 3, Issue - 4, P. No. 186 -195.

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Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: The intention behind conducting this study was to determine the perception of orthodontists, academicians and post graduate students towards the situation created by COVID-19 pandemic. Closed-ended questions pertaining to knowledge, attitude and practice were asked in the study to gauge the effects of COVID-19 on orthodontic practice.

Material and methods: This study included 21 questions. The sample size was 300. The link was circulated using

social media platforms. All responses were anonymous. Data compilation was done and subjected to statistical analysis. The participants were compared on the basis of designation by using chi square test.

Results: 99.7% respondents were in favour of lockdown extension and 78% were aware of the high risk of transmission. 91.1% agreed to follow social distancing, using face masks (77.7%) and hand hygiene measures (85.3%). 89.4% were aware of hydroxychloroquine chemoprophylaxis and its recommended dosage (65.9%).

82.2% agreed to advise adult patients not to bring friends/family along for appointments, making audio-visual aids available for patient education (89.4%), changing the seating arrangement in waiting area (91.2%) as well as academic settings (84.7%) and paying special emphasis on sterilization and disinfection (99.1%).

There were differences in beliefs of participants regarding the duration for which practice would be adversely affected. 23.5% believe that that the problem will get over in 1-3 months while 32.4%, 27.1% and 23.5% participants thought that it will affect the practice for 3-6 months, 6-12 months and more than 1 year respectively.

Conclusion: No statistically significant difference was found in the knowledge, attitude and belief of participants pertaining to the effects of COVID-19 on orthodontic practice. However, the only difference in participant beliefs was about the duration for which orthodontic practice would be adversely affected.

Keywords: COVID-19 and Orthodontics, COVID questionnaire, Orthodontic practice, Orthodontic questionnaire

Introduction

A novel outbreak of coronavirus emerged in December 2019 in China which garnered immense attention not just in China but internationally. It was deemed a pandemic by the World Health Organization (WHO). Several reports suggested a zoonotic origin of the disease. The virus was abundantly present in nasopharyngeal and salivary secretions^[1&2] of affected patients, and its spread was predominantly thought to be through respiratory droplets or physical contact.

The WHO and Centers of Disease Control (CDC) recommended avoiding: travel to high risk areas, contact with individuals who were symptomatic, and consumption of meat from regions with known COVID-19 outbreak.

Basic hand hygiene measures were also recommended, including frequent hand washing with soap, using hand sanitizers and wearing face masks.^[3] However, despite their efforts, it was extremely difficult to contain the spread of the disease due to the community spread pattern of the infection.

To tackle this global health emergency, nations began taking measures for prevention. In India, a mandatory lockdown was imposed by the government wherein the people were directed to stay at home in order to be safe. People were advised to follow social distancing, maintaining a distance of at least three feet from other individuals^[3-5] which was later changed to 6 feet.^[5] Only essential services were available. Since the virus was abundantly present in nasopharyngeal and salivary secretions of affected patients, the risk of transmission to dentists was deemed to be high. As a result, dental practice was put on hold. Several patients were already undergoing orthodontic treatment when the lockdown was imposed. This led to disruption of scheduled appointments.^[6] Due to the unprecedented nature of COVID-19 pandemic and the unspecified length of mandatory lockdown, orthodontic practice was adversely affected.

This study was specifically designed to evaluate and compare the effects of COVID-19 outbreak on orthodontic practice. Relevant information was gathered using online databases like PubMed and Google Scholar and health bodies such as CDC and WHO. An online questionnaire was prepared and circulated to orthodontists, academicians and post graduate students in India and their responses were evaluated. The statistical analysis used for obtaining the results was the chi square test.

Therefore, the aim was to study the effects of COVID 19 pandemic and the mandatory lockdown on orthodontic practice. The objectives were to compare the responses of

orthodontists, academicians and post graduate students, determine the effects of lockdown on orthodontic practice and prospective changes expected post lockdown.

Material And Methods

The questionnaire was prepared using QuestionPro. It included a total of 21 questions, the first being designation of the respondent. The remaining 20 questions were related to the situation created by mandatory lockdown, how it was affecting practice, post lockdown measures to be taken for prevention, and long-term effects of COVID-19 on orthodontic practice. All questions were pre-validated. The survey was designed such that it took only a few minutes to fill the questionnaire. The link of the survey was circulated using various social media platforms like WhatsApp and e-mail. It included a disclaimer clarifying that all responses were kept anonymous. Answering all questions was mandatory. A randomly selected sample size of 300 respondents was finalized. All of the respondent data was auto saved. Only the respondents who completely filled the survey were included in the final result.

Statistical Analysis

The collected data was compiled systematically and coded in Microsoft Excel and subjected to statistical analysis using SPSS IBM version 22.0 (IBM Corporation, Armonk, NY, USA). The level of significance was fixed at $p \leq 0.05$. Chi square test was performed to compare the differences in response among the three categories of participants.

Results

The questionnaire had been sent to 750+ Orthodontists. Total 347 Orthodontists had responded to the survey. Data received from 7 (n=7) respondents had been removed because of failure to answer all questions. The 340 participants who had completely filled the survey form were included for data analysis.

The obtained data was compiled systematically and coded in MS Excel and subjected to statistical analysis with the consultation of a statistician.

Total 340 orthodontists responded to the survey. It included 162 (47.7%) practicing orthodontist, 146 (42.9%) postgraduate students and 32 (9.4%) academicians. (Table 1)

The study result found that 268(78.8%) of the total respondents strongly believed and 62(18.2%) believed that dentists are at a high risk of transmission. Only 6 respondents disagreed with the statement. Most of the respondents 260(76.4%) believed that COVID-19 has changed consultation permanently. Most of them agreed to follow social distancing 310(91.1%), wearing masks even while not attending patients 264(77.7%) and using hand sanitizers 324(85.3%) even after lockdown ends. (Table 2)

Almost all the participants 339 (99.7%) thought that the lockdown should have been extended after 14 April in India. Most of them 314 (89.4%) were aware of the hydroxychloroquine prophylaxis and 224 (65.9%) agreed to follow the recommended dose. 94.1% of the participants were in favor of providing personal protective equipment to clinical staff and PG students as prophylaxis considering the severity of the disease. Most of the participants had the attitude of bringing the changes in their practice after the lockdown and strongly believed that there will be a drop in patients preferring orthodontic treatment will be encountered. (Table 3&4)

Most of the orthodontists agreed that they received calls from the patients regarding further treatment schedule [n=242(71.2%)] and urgent treatment [152(42.7%)]. The participants also believed that prolonged duration between the patients' visit will adversely affect the treatment. (Table 5)

There were differences in beliefs of participants regarding the duration for which practice would be adversely affected. 23.5% believe that the problem will get over in 1-3 months while 32.4%, 27.1% and 23.5% participants thought that it will affect the practice for 3-6 month, 6-12 month and more than 1 year respectively. (Fig 1)

The participants were compared on the basis of designation by using chi square test and it was found that there was no significant difference among the knowledge, attitude and belief of the participants regarding the effect of orthodontic practice because of COVID 19 outbreak.

Discussion

Considering the high potency of coronavirus, its severity of infection and high fatality rates, implementation of lockdown across India by the government seemed an obligatory move. In this study, all except one respondent favored the extension of lockdown across the country after 14th of April 2020 which is probably attributable to the realization that it would prevent the spread of infection. Retrospectively, the lockdown had been extended till July. Studies [1&2] have been conducted since the emergence of COVID-19 to identify the risks it poses to the dental fraternity. These studies provide evidence that dentists are at high risk of getting infected and transmitting it to others.

The routes of transmission in dentistry are given in Fig 2. [7]

The WHO recommendation for COVID-19 prevention was avoiding contact with other individuals and maintaining a distance of 3 feet among individuals [3,7]. It had not been possible to implement this in orthodontic practice due to the nature of the orthodontic procedures, which put the orthodontist and their assistant at a high risk of acquiring the infection. The various sources of transmission in the orthodontic setup are patient's saliva, aerosols and orthodontic supplies and instruments [10].

Therefore, orthodontists had been advised not to schedule any patients and limit themselves to providing only emergency orthodontic care during the pandemic.

The Indian Council for Medical Research had recommended chemoprophylaxis with hydroxychloroquine (400 mg twice on day 1, then 400 mg once a week thereafter) for asymptomatic healthcare workers treating patients with suspected or confirmed COVID-19, and for asymptomatic household contacts of confirmed cases [9&10]. Even though the use of hydroxychloroquine as a potential prophylactic drug for COVID-19 had been advocated by the Indian Council for Medical Research, no drug is guaranteed to be safe, and wide use of hydroxychloroquine results in patient exposure to rare but potentially fatal damages like serious cutaneous adverse reactions, fulminant hepatic failure, and ventricular arrhythmias (especially when prescribed with azithromycin). Overdose has been found to be hazardous and difficult to treat [11]. Therefore, the efficacy of this drug has been highly questionable. All respondents in this study were aware of risks of transmission posed by COVID-19 and were of opinion that employing preventive measures like use of hydroxychloroquine prophylaxis, personal protective equipment (PPE) as well as making changes in their practice will prove to be highly beneficial. Even though orthodontic practice was suspended due to COVID-19, patients called for help or enquiries. Advising patients over phone calls regarding appliance breakages, patient concerns, cancellation of appointments and enquiries regarding next appointments occurred frequently. Most participants included in this study agreed to have advised patients over phone calls. Fig 3 describes various situations requiring immediate intervention as well as how these situations can be managed. [12]

Although orthodontic practice has been put on hold due to COVID-19, resumption of practice is important

nonetheless. Practice cannot remain suspended indefinitely. Guidelines and recommendations have been put forth by leading health organizations regarding prevention and infection control of COVID-19. The recommended WHO guidelines for healthcare workers are [13].

- Following established occupational safety and health procedures, avoiding exposing others to health and safety risks, and participating in employer-provided occupational safety and health training;
- Using provided protocols to assess, triage, and treat patients;
- Treating patients with respect, compassion, and dignity;
- Maintaining patient confidentiality;
- Following established public health reporting procedures of suspected and confirmed cases;
- Providing/reinforcing accurate IPC and public health information;
- Put on, use, take off, and dispose of PPE properly;
- Self-monitoring for signs of illness followed by self-isolation, reporting illness to managers if it occurs;
- Advising management in case they experience signs of undue stress or mental health challenges that require supportive interventions; and
- Reporting to their immediate supervisor any situation which they have reasonable justification to believe presents an imminent and serious danger to life or health.

The CDC guidelines for resumption of practice during the COVID-19 pandemic are as follows [14].

Before Patients Arrival

- Prepare the clinic.
 - Know which of your patients are at higher risk of adverse outcomes from COVID-19.

- Consider and plan for providing more telemedicine appointments.
- Stay connected with your health department to know about COVID-19 in your community. Step up precautions when the virus is spreading in your community.
- Assess and restock supplies now and on a regular schedule
- Communicate with patients.
 - Ask patients about symptoms during reminder calls.
 - Consider rescheduling non-urgent appointments.
 - Post signs at entrances and in waiting areas about prevention actions.
- Prepare the waiting area and patient rooms.
 - Provide supplies—tissues, alcohol-based hand rub, soap at sinks, and trash cans.
 - Place chairs 6 feet apart, when possible. Use barriers (like screens), if possible.

Train and prepare the staff.

- Ensure that clinical staff knows the right ways to put on, use, and take off PPE safely.
- Recognize the symptoms—fever, respiratory symptoms like cough or shortness of breath and other symptoms.
- Implement procedures to quickly triage and separate sick patients.
- Emphasize hand hygiene and cough etiquette for everyone.
- Ask staff to stay home if they are sick.
- Send workers home if symptoms develop at work.

When Patients Arrive

- Place staff at the entrance to ask patients about their symptoms.
 - Provide symptomatic patients with tissues or facemasks to cover mouth and nose.
 - Limit non-patient visitors.

- Separate sick patients with symptoms.
- Create separate spaces in waiting areas for sick and well patients.

After Patients are Assessed

- Provide at-home care instructions to patients with respiratory or other symptoms. Consider tele health options for follow up.
- Notify your health department of patients with COVID-19 symptoms.
- After patients leave, clean frequently touched surfaces using disinfectants.

The Dental Council of India (DCI) has recently proposed the post-COVID dental clinic considerations ^[15]. These are:

- Avoiding aerosol producing procedures
- Recording the temperature of all staff and patients along with relevant medical history
- Before initiating dental procedures, classifying patients into emergency and non-emergency care

- Washing hands with soap and water followed by alcohol based hand sanitizers before and after patient screening.
- Scrubbing patients with isopropyl alcohol extraorally prior to any dental procedure.
- Wearing N-95 masks, head caps, face shield and shoe covers in the clinic at all times.
- 1% hydrogen peroxide to be used in patients as a mouth rinse
- Periodic fumigation of clinics
- Disinfection of door handles, chairs and bathrooms
- Displaying awareness posters regarding COVID-19 at prominent locations of clinical area
- Changing from personal clothing to scrubs while at the clinic
- Maintaining patient records properly.

Table 1: Designation of the participants

Designation	Frequency	Percent
Practicing Orthodontist	162	47.7
PG student	146	42.9
Academician	32	9.4
Total	340	100.0

Table 2: Risk of transmission and changes after resumption of practice

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Dentists are at a high risk of transmission	4 (1.2%)	2 (0.6%)	4 (1.2%)	62 (18.2%)	268(78.8%)
COVID-19 has changed consultation permanently	4 (1.2%)	14(4.1%)	62(18.2%)	146(42.9%)	114(33.5%)
I will follow social distancing even after the lockdown ends	6(1.8%)	61.8%)	18(5.3%)	130(38.2%)	180(52.9%)
I will start wearing mouth masks even when not	6(1.8%)	16(4.7%)	54(15.9%)	138(40.6%)	126(37.1%)

attending patients					
I will continue using hand sanitizers even after the lockdown ends	5(1.5%)	1(0.3%)	10(2.9%)	86(25.3%)	238(70%)

Table 3: Lockdown extension, COVID-19 prevention, prophylaxis and orthodontic practice changes

Question	Yes	No
Lockdown should have been extended after 14th April?	339 (99.7%)	1 (0.3%)
Are you aware of hydroxychloroquine prophylaxis?	314 (89.4%)	36 (10.6%)
Would you follow the recommended dosage of 400mg BD on day 1 followed by once weekly for next 7 weeks to be taken with meals?	224 (65.9%)	116 (34.1%)
Are you in favor of providing personal protective equipment to clinical staff and PG students as prophylaxis?	320(94.1%)	20(5.8%)
Have you advised your patients over phone calls since the lockdown started?	320(94.1%)	20(5.8%)
After the lockdown period, will you advise adult patients to refrain from bringing friends/family along for consultation?	280(82.4%)	60(27.6%)
When you restart, will you make audio-visual aids available for patient education regarding COVID-19	314(89.4%)	36(11.6%)
Will you pay special emphasis on sterilization and disinfection?	337(99.1%)	3(0.9%)
Would you consider it mandatory to change the seating arrangement in clinical as well as academic settings?	288 (84.7%)	52(15.3 %)
Do you think there will be a drop in new incoming orthodontic patients post lockdown?	256(75.3%)	84(24.7%)

Table 4: Value of significance

Question	P Value
Lockdown should have been extended after 14th April?	0.57
Are you aware of hydroxychloroquine prophylaxis?	0.65
Would you follow the recommended dosage of 400mg BD on day 1 followed by once weekly for next 7 weeks to be taken with meals?	0.62
Are you in favor of providing personal protective equipment to clinical staff and PG students as prophylaxis?	0.89

Have you advised your patients over phone calls since the lockdown started?	0.65
After the lockdown period, will you advise adult patients to refrain from bringing friends/family along for consultation?	0.81
When you restart, will you make audio-visual aids available for patient education regarding COVID-19	0.59
Will you pay special emphasis on sterilization and disinfection?	0.95
Would you consider it mandatory to change the seating arrangement in clinical as well as academic settings?	0.72
Do you think there will be a drop in new incoming orthodontic patients post lockdown?	0.65

Table 5: Telephonic consultation

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
I have received numerous calls from patients regarding further treatment schedule	16 (4.7%)	22(6.5%)	60(1.2%)	132(38.8%)	110(32.4%)
I have received numerous calls from patients requiring urgent treatment	38(2.9%)	56(16.5%)	94(27.6%)	90(26.5%)	62 (18.2%)
Prolonged duration between patient visits will adversely affect treatment	14 (4.1%)	24 (7.1%)	60 (17.6%)	132(38.8%)	110(32.4%)

Figures

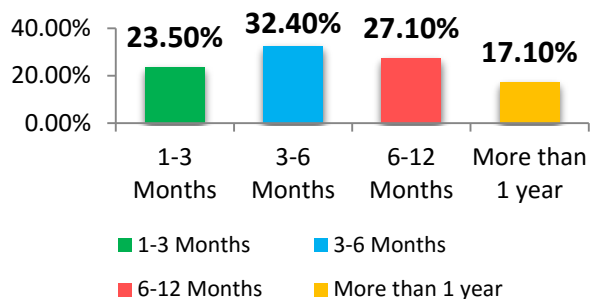


Fig 1: Duration for which orthodontic practice will be adversely affected

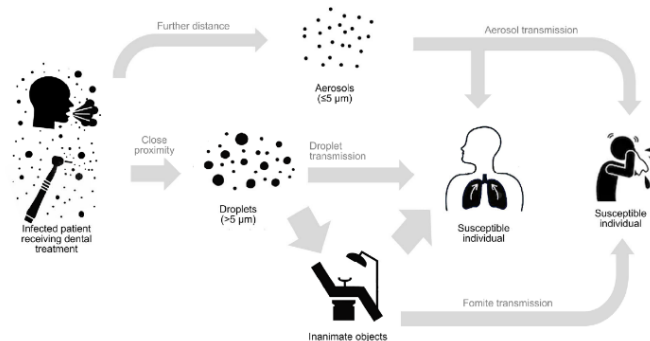


Fig 2: The routes of transmission in dentistry

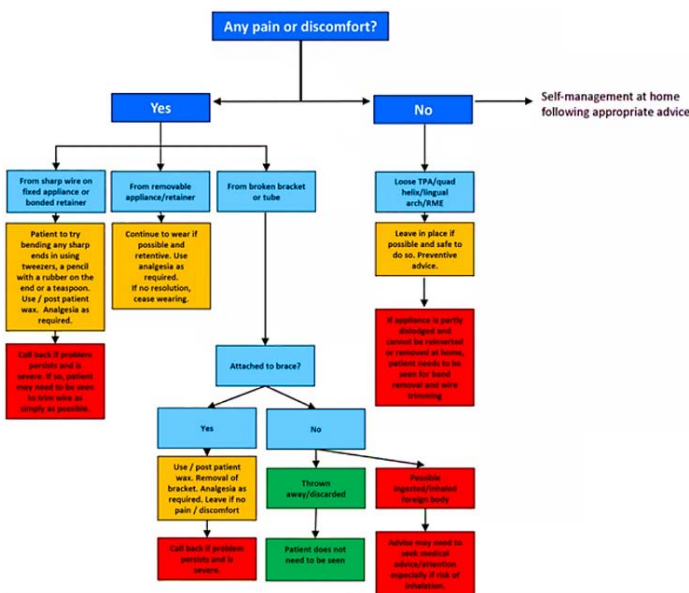


Fig 3: Flow-chart describing orthodontic problems and their management

Conclusion

The participants were compared on the basis of designation by using chi square test and it was found that there was no statistically significant difference among the knowledge, attitude and belief of the participants regarding the effect of orthodontic practice because of COVID 19 outbreak. The only difference in opinion was regarding the duration for which practice would be adversely affected.

COVID-19 is an eminently transmissible infection. The orthodontic scenario requires avoiding aerosol production and human-to-human contact as well as limiting orthodontic care to emergency cases during the pandemic outbreak. It is mandatory to ensure safety and stop cross contamination within the clinical facility. Therefore, understanding the significance of proper work practices like hand hygiene, infection prevention and control, and personal protection is crucial.

Studies can be conducted in the future, comprising of more specifically designed questions related to COVID-19, methods of sterilization and disinfection, orthodontic practice scenario pre and post COVID-19.

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